

We claim:

26. Article feeding apparatus of the type in which flat articles such as sheets are moved downstream along an article flow path, having a device called a prompter, for moving articles along the flow path, which prompter comprises:

a shaft, running transversely to the flow path;

a first roller, mounted on the shaft;

a body, having a first end and second end lying along the body length; the first end pivotably engaged with the shaft proximate the first roller;

a second roller, mounted at the second end of the body;

a belt, mounted on and endlessly running around the first and second rollers, having a surface adapted to frictionally engage and move downstream articles along the flow path, when the body second end is positioned upstream of the first end;

means for moving the belt around the rollers and thus rotating the rollers; and,

means for imparting to the body a first moment created by a rotary friction force applied to the body; wherein the first moment urges the body to rotate around the shaft and thereby press at the second roller end against any article lying along the flow path.

27. The apparatus of claim 26 wherein the means for moving the belt comprises driving the first roller by rotating the shaft; and, wherein the body first end is bifurcated to straddle the first roller and frictionally engage the rotating shaft, to thereby create said first moment.

28. The apparatus of claim 27 wherein the belt is made of elastomer and is stretched between the rollers, so tension in the belt holds the body in

frictional and pivotable engagement with the shaft, to thereby create said first rotary force.

29. The apparatus of claim 27 wherein frictional engagement of the belt with an article resistant to motion imparts to the body, in the same direction as the first moment, a second moment proportional to the resistance of the article to motion along the flow path.

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30. ~~The apparatus of claim 26 of the further type wherein the article flow path lies along a plane; wherein sheets are drawn from a stack lying on said plane; wherein the prompter second roller lies above the stack at an elevation higher than the elevation of the first roller, relative to said plane; and, wherein the height of the stack relative to the plane decreases from a first elevation to a second elevation, when sheets are moved downstream by the prompter.~~

31. The apparatus of claim 26 wherein the belt has a surface comprised of a plurality of transverse ribs having cross sections which make the ribs substantially deflectable when the belt pulls an article along the flow path.

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32. ~~The apparatus of claim 31 wherein the height to width aspect ratio of each rib cross section is between about 1.3:1 and 4:1.~~

33. The apparatus of claim 26 wherein the second roller has an axle shaft which rotates when the second roller rotates; further comprising: a second prompter having a first roller thereof mounted on and rotatably driven by said axle shaft.

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34. In an article feeding apparatus of the type in which flat articles such as sheets are caused to move downstream along an article flow path, the improvement comprising: a device called a prompter, for moving articles along the flow path, which prompter comprises:

a shaft, running transversely to the flow path;

a first roller, mounted on the shaft;

a body, having a first end and second end lying along the body length; the first end pivotably engaged with the shaft proximate the first roller;

a second roller, mounted on and fastened to an axle at the second body end, the axle running transverse to the body length;

a belt, mounted on and endlessly running around the first and second rollers, having a surface adapted to frictionally engage and move downstream articles along the flow path, when the body second end is positioned upstream of the first end;

means for moving the belt around the rollers and thus rotating the rollers; and,

a pair of wheels, for frictionally engaging articles, fastened to said axle at opposing ends of the second roller, each wheel having an outside diameter greater than the outside diameter of the belt where it runs around the second roller.

35. The improvement apparatus of claim 34 wherein the axle is pivotable in a plane transverse to the body length.

36. The apparatus of claim 26 of the type further comprising a singulator comprised of a driver and a retarder, wherein articles are moved by the prompter along the flow path toward the singulator; wherein said prompter

belt at the first roller comprises said singulator driver; wherein the prompter belt has a surface with a groove running along its centerline; and, wherein the retarder is positioned to fit within the groove of the belt.

37. Article feeding apparatus of the type in which flat articles such as sheets are moved downstream along an article flow path, having a device called a prompter, for moving articles along the flow path, which prompter comprises:

a shaft, running transversely to the flow path;
a first roller, mounted on the shaft;
a body, having a first end and second end lying along the body length; the first end pivotably engaged with the shaft proximate the first roller;
a second roller, mounted at the second end of the body;
a belt, mounted on and endlessly running around the first and second rollers, having a surface adapted to frictionally engage and move downstream articles along the flow path, when the body second end is positioned upstream of the first end;

means for moving the belt around the rollers and thus rotating the rollers;

a first device positioned downstream from the prompter second end, to receive, frictionally engage, and move downstream articles delivered to the device path by the prompter; the first device adapted to move articles downstream faster than does the prompter belt; and,

wherein the means for moving the prompter belt comprises an overrunning clutch engaged with the first roller, so an article frictionally engaged simultaneously with the prompter belt and the first device is moved faster than is dictated by the means for moving the

prompter belt, while still being substantially frictionally engaged with said belt.

38. The article feeding apparatus of claim 37 wherein the means for moving the prompter belt comprises rotating said shaft in combination with said overrunning clutch and the first roller; and, wherein said first device comprises a singulator having a driver mounted on and rotated by said shaft; the driver having an outside diameter larger than the outside diameter of the belt at the first roller.

39. ~~Article feeding apparatus of the type in which flat articles such as sheets are moved downstream along an article flow path, having a device called a prompter, for moving articles along the flow path, which prompter comprises:~~

~~a shaft, running transversely to the flow path;
a first roller, mounted on the shaft;
a body, having a first end and second end lying along the body length;
the first end pivotably engaged with the shaft proximate the first roller;
a second roller, mounted at the second end of the body;
a belt, mounted on and endlessly running around the first and second rollers, having a surface adapted to frictionally engage and move downstream articles along the flow path, when the body second end is positioned upstream of the first end;~~

~~means for moving the belt around the rollers and thus rotating the rollers;~~

~~opposing mounting blocks, slidably and detachably mounted on the apparatus;~~

~~the shaft journaled at opposing ends in the mounting blocks, each~~

block slidable along a plane transverse to the length of the shaft, to enable adjustment thereof; and,

resilient means for keeping the mounting blocks connected to the apparatus during use.

40. Article feeding apparatus of the type in which flat articles such as sheets are moved downstream along an article flow path and through a singulator nip, having a singulator nip gap spacing, comprising:

(a) a device called a prompter, for moving articles along the flow path, which prompter comprises:

a shaft, running transversely to the flow path;

a first roller, mounted on the shaft;

a body, having a first end and second end lying along the body length; the first end pivotably engaged with the shaft proximate the first roller;

a second roller, mounted at the second end of the body;

a belt, mounted on and endlessly running around the first and second rollers, having a surface adapted to frictionally engage and move downstream articles along the flow path, when the body second end is positioned upstream of the first end;

means for moving the belt around the rollers and thus rotating the rollers; and,

(b) a singulator comprised of:

a driver for moving articles downstream through the nip by rotation in a first direction;

a retarder, called a dancer, positioned in close proximity to the driver, to form the singulator nip;

the dancer movably mounted to enable a portion thereof to translate generally along the article flow path; and,

means for resiliently biasing the dancer in the upstream flow path direction;

wherein, the gap spacing between the dancer and driver is changed by translation of said dancer portion in the downstream direction, when an article passes through the nip.

41. The apparatus of claim 40 which further comprises: the dancer comprising a body; a belt, movable in one direction only around the exterior of the body of the dancer, for contacting articles in the nip and for contacting the driver in the absence of any article in the nip; wherein, when the direction of rotation of the driver is reversed, the driver frictionally engages said belt and causes said belt to move about the exterior of the body of the dancer in said one direction, to thereby expose a new portion of the belt in vicinity of the nip.

42. The apparatus of claim 40, which further comprises: the dancer movable linearly; wherein, articles move along the flow path through the nip along a line of travel which is at an angle to the direction in which said dancer portion is movable.

43. The apparatus of claim 40, wherein the articles move generally along a horizontal plane, which further comprises: the dancer mounted to pivot in a vertical plane direction about a pivot point spaced apart from said dancer portion; the dancer portion pivoting slightly in the vertical plane when an article passes through the nip, said downstream translation comprising a component of the slight pivoting motion.

44. The apparatus of claim 43, the dancer having a belt mounted on rollers,

Q2 to provide a belt surface at the nip; wherein, pivoting of the dancer causes incremental movement of the belt on the rollers.

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